



Original article

Actual and perceived nursing workload and the complexity of patients with total hip arthroplasty

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ABSTRACT

Background: Little is known about the relation between patient complexity and nursing care of total hip arthroplasty (THA) patients. To improve patient care and hospital logistics, the aim of this study is to gain insight into the relation between patient complexity and the nursing staff's actual and perceived workload at an orthopedic ward during admission for a THA.

Design: Prospective cohort study of 45 THA patients in the year 2014. Duration and type of nursing care activities were recorded during the first postoperative morning. A questionnaire was used to analyze the perceived workload of the nursing staff. Both actual and perceived workload were analyzed for their relation with patient complexity, expressed in the American Society of Anesthesiologists (ASA) score, Charlson comorbidity index (CCI), Katz Activities of Daily Life score (Katz-ADL) and Body Mass Index (BMI).

Results: No relation was found between actual workload and measures for patient complexity. The perceived workload of the nursing staff was related to two complexity measures: ASA ($r = 0.71$; $p < 0.001$) and CCI ($r = 0.65$; $p = 0.002$).

Conclusion: Patient comorbidity is related to the perceived workload of the nursing staff during admission for a THA. Patient complexity is not related to actual workload. This study gives a first insight into the relation between patient comorbidity and nursing staff workload, to try to improve staffing numbers at the ward as well as patient care in the process.

1. Introduction

Each decennium the number of patients that undergo a total hip arthroplasty (THA) increases (Hooper, Lee, Rothwell, & Frampton, 2014). In the Netherlands, this number has increased by 50% in the period 1995–2005 and is projected to increase another 50% by 2030 (Otten, van Roermund, & Picavet, 2010). In addition more older patients are operated on (Hooper et al., 2014; Otten et al., 2010), and this also includes more complex patients with several comorbid diseases. To get an indication of patient complexity, several comorbidity measures can be used.

A systematic literature review found that more complex patients had a longer length of hospital stay after receiving a THA and generated higher hospital costs (Olthof, Stevens, Bulstra, & van den Akker-Scheek, 2014). It is hypothesized that these costs could be the result of added nursing care and interventions during THA admission. There is ample literature available that has analyzed the relation between patient complexity and nursing care during admission for THA. We found only

one study that demonstrated a relation between patient comorbidity and the number of nursing activities during hospital stay for THA (Lee & Moorhead, 2014). We found no literature that analyzed the relation between patient complexity and actual workload of the nursing staff.

When patient complexity is related to the amount and type of nursing care, hospital logistics (e.g. operation planning, staffing numbers) can be adjusted to it. The relation between patient complexity and perceived workload of the nursing staff is also unknown. Nurses' perceived workload can vary by the extent to that nurses feel responsibilities in care, not by the actual amount of time spent for patient care only. A higher perceived workload can result in more work-related stress and a higher rate of absenteeism (Davey, Cummings, Newburn-Cook, & Lo, 2009; Zangaro & Soeken, 2007).

The objective of this study is therefore to gain insight into the relation between patient complexity and nursing care for THA patients. First, it is examined whether patient complexity is related to the duration of the work of the nursing staff at an orthopedic ward. The relation between patient complexity and perceived workload of the

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nursing staff is subsequently analyzed. The aim of this study was to gain insight into the relation between nursing staff workload, both actual and perceived, and the complexity of patients receiving a total hip arthroplasty. We hypothesize that patient complexity is related to actual and perceived workload.

2. Methods

2.1. Design

In a prospective time-and-motion study (Pelletier & Duffield, 2003), patients were observed by a medical student on the ward on the morning of the first postoperative day (from 07:15 to 12:00 AM). This time period was chosen because it was hypothesized to be the time period when differences in nursing care would first stand out between patients. Since patients have to become more active, especially during ADL activities in the morning of their first postoperative day and regardless of operation time the previous day, differences between complex and less complex patients were hypothesized to be present. All activities provided to the patient on the ward by nursing staff were recorded and divided into six categories: Medical-technical tasks, Communication, Transportation, Eating/Drinking, Activities of Daily Living (ADL), and Other. The data were collected during February 2014 and July 2014.

2.2. Participants

A sample of THA patients was recruited from both a large general hospital and an academic hospital in order to ensure a mix of patients with different grades of complexity. Inclusion in the study was based on the following requirements: the patient was willing to participate in the study; the first postoperative day had to be a weekday; and the observer was available for both the day of inclusion (preoperative day) and the first postoperative day. All patients that met these criteria were included. No patients were 'missed' in the data collection due to double planning in both hospitals. Two medical students were available for the data collection. During the observation period, the same nursing staff provided the medical care for the THA patient.

2.3. Data collection

We collected demographic patient data (age and sex), patient complexity data and length of stay (LOS) using patients' records. Patient complexity was measured using instruments that relate comorbidity to LOS after THA (Olthof et al., 2014). The first tool is the widely used American Society of Anesthesiologists (ASA) score, to assess patients' preoperative physical status. It ranks patients into six groups based on the severity of their comorbid diseases (ASA Classification, 2013; Davenport, Bowe, Henderson, Khuri, & Mentzer, 2006). The second tool is the Charlson Comorbidity Index (CCI). The CCI is a valid and reliable tool that classifies comorbidity. It scores 19 comorbid conditions at 1–6 points, depending on its severity (Charlson, Pompei, Ales, & MacKenzie, 1987; de Groot, Beckerman, Lankhorst, & Bouter, 2003; Hall, Groome, Streiner, & Rochon, 2006). For this study we calculated the CCI using the Royal College of Surgeons (RCS) method, as presented previously in literature (Armitage & van der Meulen, 2010). The third tool, the Katz-ADL score, measures patients' independence in activities of daily living. A patient who can perform all Activities of Daily Life (ADL) independently scores category A. For every additional ADL that requires assistance, the patient scores a lower category (van Aalst, Oosterhof, Nijhuis-van der Sanden, & Schreurs, 2014). The fourth tool is Body Mass Index (BMI), a measure of weight compared to height (Maradit Kremers, Visscher, Kremers, Naessens, & Lewallen, 2014). The ASA score was extracted from the preoperative screening form. CCI and BMI were calculated by the observer. The Katz-ADL was derived from the admission form.

We also used a self-developed questionnaire to assess perception of workload by the nursing staff during the same part of the day that their activities were observed. This questionnaire listed the same six categories of nursing activities. The categories could be rated by "low", "average" or "high" intensity. The percentage of categories scoring "high" was used as a measure of workload intensity. The questionnaire is presented in Appendix A.

2.4. Ethical considerations

The study was conducted in accordance with the regulations of the Medical Ethical Board of our institution (METc 2012.412).

2.5. Data analysis

The relation between patient complexity and both duration of work and perceived workload was analyzed using the Pearson correlation test for scale data (BMI and CCI) and the Spearman rho test for ordinal data (ASA score and Katz-ADL). The following cut-off points for correlation coefficients were used: 0.00–0.25, very weak; 0.26–0.49, weak; 0.50–0.69, moderate; 0.70–0.89, strong; 0.90–1.00, very strong (Domholdt, 2000). All data was analyzed using SPSS 20.0, and differences in p-values < 0.05 were considered to be significant.

3. Results

A total of 45 patients who received a THA in either the academic (20 patients) or the general hospital (25) were included. Patients were on average 64.8 years old. The population included 66% females. Average LOS was 6.0 days (SD = 4.2) for the entire study population – 8.9 days at the academic hospital and 3.1 days at the general hospital. All patient characteristics are presented in Table I.

On average, nursing staff provided 70 (SD = 21.4) minutes of direct patient care the morning of the first postoperative day (67 (SD = 20.8) minutes at the academic hospital and 72 (SD = 22.7) minutes at the general hospital). The most time was spent on Medical-technical tasks (39 min (SD = 11.3)) and ADL (19 min (SD = 9.9)). Less time was spent on Communication (3 min (SD = 2.9)), Transportation (3 min (SD = 10.8)), Eating/Drinking (2 min (SD = 1.0)) and Other (3 min (SD = 2.4)) (see Table II for an overview of all nursing activities). Table

Table I
Patient characteristics (n = 45).

	Academic hospital (n = 20)	General hospital (n = 25)
Age	67.3 (8.5)	62.8 (10.6)
Sex (female)	16 (60%)	14 (66%)
ASA-classification		
Healthy	1 (5%)	6 (24%)
Mild systemic disease	10 (50%)	15 (60%)
Severe systemic disease	9 (45%)	4 (16%)
Charlson Comorbidity Index		
0	10 (50%)	9 (36%)
1	5 (25%)	7 (28%)
2	2 (10%)	6 (24%)
3	2 (10%)	0
> 4	1 (5%)	3 (12%)
BMI	28.2 (5.7)	29.0 (4.5)
KATZ ADL score		
A	0	0
B	0	1 (4%)
C	2 (10%)	4 (16%)
D	7 (35%)	2 (8%)
E	5 (25%)	10 (40%)
F	6 (30%)	7 (28%)
G	0	1 (4%)

Results in mean (SD) or n (%). ASA: American Society of Anesthetists, BMI: Body Mass Index; ADL: Activities of Daily Life.

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